SHORT ARTICLE

About the need for an assessment on the risk of pollution from the fuel on board the shipwreck of the former USS Peacock in the Bay of Cartagena de Indias

Sobre la necesidad de una evaluación del riesgo de contaminación por el combustible a bordo del naufragio del USS "Peacock" en la bahía de Cartagena de Indias

DOI: https://doi.org/10.26640/22159045.2023.614 **Date received:** 2023-04-27 / Date accepted: 2023-07-28

Carlos Alberto Andrade Amaya[1]

CITATION:

Andrade Amaya, C. A. (2023). About the need for an assessment on the risk of pollution from the fuel on board the shipwreck of the former USS Peacock in the Bay of Cartagena de Indias. *CIOH Sci. Bull.*, 41(2), 51-59. Online ISSN 2215-9045. DOI: https://doi.org/10.26640/22159045.2023.614.

ABSTRACT

The tugboat USS Peacock was sunk near the tip of the Castillogrande peninsula in the Bay of Cartagena when it accidentally collided with the Norwegian-flagged merchant ship MS Hindanger on 23 August 1940. Almost split in two, it quickly sank, killing three crew members while 23 were rescued. Since it started to be monitored in 1992, it has been noted that fuel drops sporadically come out of the shipwreck and its position coincides with the measurements of the highest concentration of hydrocarbons in the bay. The Diving and Salvage Department of the Colombian Navy has been monitoring this situation that is still ongoing. Therefore, this article suggests a research project to evaluate of the amount of fuel that the shipwreck may have on board and to study the alternatives to remove it in order to allay the environmental risk.

KEYWORDS: Bay of Cartagena, shipwrecks, USS Peacock, fuel pollution.

RESUMEN

El remolcador USS "Peacock" se encuentra hundido cerca de la punta de Castillogrande, en la bahía de Cartagena, producto de un accidente cuando fue abordado por el buque mercante de bandera noruega MS "Hindanger", el 23 de agosto de 1940. Casi partido en dos se hundió rápidamente, muriendo tres tripulantes y 23 fueron rescatados. Desde su reubicación, en 1992, se ha observado que esporádicamente salen gotas de combustible del naufragio. Su posición coincide con mediciones de alta concentración de hidrocarburos en la bahía. El Departamento de Buceo y Salvamento de la Armada de Colombia ha estado monitoreando esta situación que aún continúa. Por ello, se recomienda un proyecto de investigación para la evaluación de la cantidad de combustible que pueda tener a bordo el naufragio, y que se estudien las alternativas para retirarlo, con el fin de despejar el riesgo ambiental.

PALABRAS CLAVE: *bahía de Cartagena, naufragios, USS Peacock, contaminación por combustible.*

[1] Orcid: 0000-0002-4784-7474. Researcher at the Exploraciones Oceánicas de Colombia S.A.S., Colombia. Email: candrade@exocol.com

Introduction

As a result of World War II (1939-1945), more than 6 300 ships lie submerged in the world's oceans, with an estimated 2.5 to 20.5 million tons of fuel remaining in their tanks. This represents a potential contamination equivalent to 700 times the Exxon Valdez oil tanker accident in Alaska (Deutsche Welle, 2020). Currently, several shipwrecks have started to show signs of significant fuel leakage due to the gradual corrosion-induced deterioration of the metal walls of their tanks. Some countries, such as Norway, have taken on the task of extracting fuel from shipwrecks in their waters, understanding that if fuel still remains in the shipwrecks' tanks, it is a ticking time bomb (Schmidt-Ekin, 2011).

The maritime tugboat USS Peacock is one of the shipwrecks that fit into this narrative of World War II. Although it appears to be an accident, when it encountered a Norwegian-flagged merchant vessel, the MS Hindanger, at a critical point in the navigation channel of the Bay of Cartagena de Indias, it was violently struck on the starboard side near the engine room and sank rapidly. The wreck has been marked on navigation charts since the time of its sinking (Fig. 1) and has been previously characterized (Santos & Rojas, 2015; Andrade, 2021) concerning its position, layout, and stability. In this context, this article addresses the concern that it may still contain significant quantities of fuel and its proximity to the coastline within the inner bay.

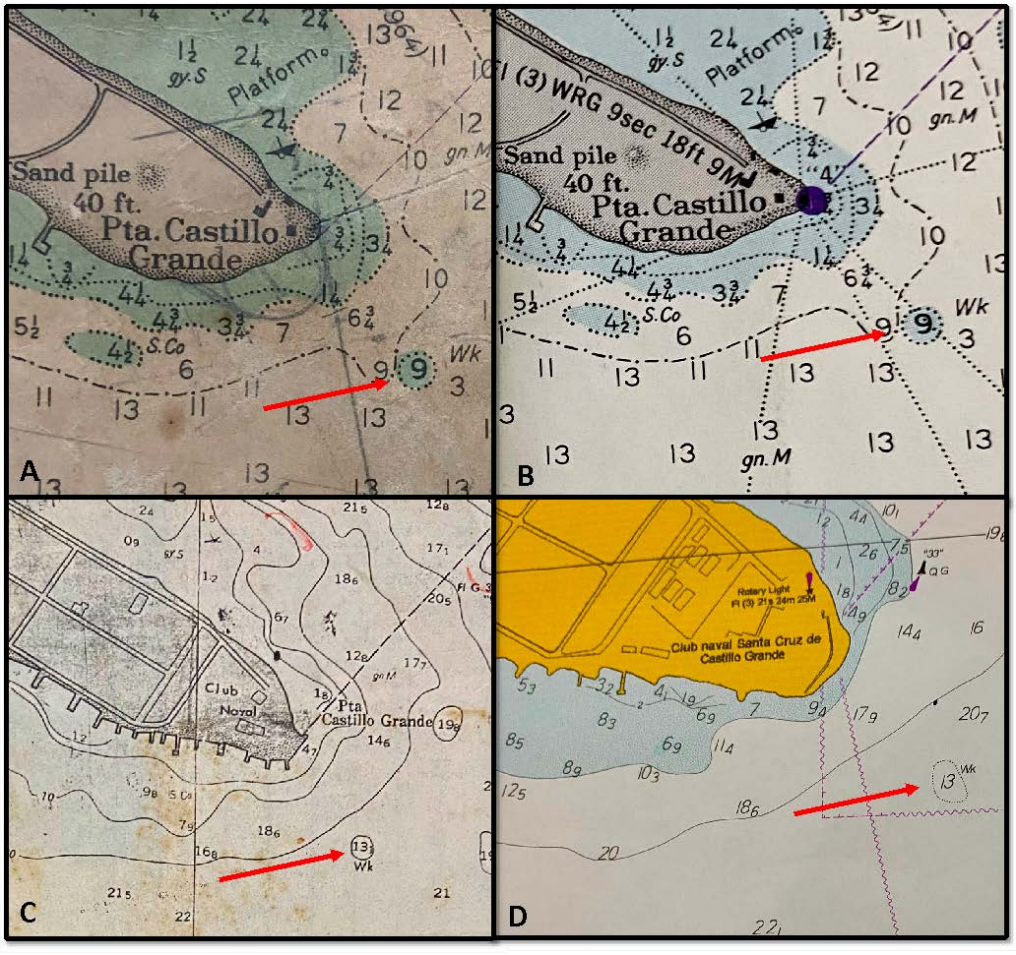

Figure 1. The wreck's position on navigation charts: (**A)** On chart US 24505, Rev. 1966. (**B)** On the same chart updated in 1976. (**C)** On chart COL 262 from 1982. (**D)** On chart COL 840 from 2000 (indicated as Wk)

Study Area

In a strict sense, the study area corresponds to the area of the shipwreck in the navigation channel, near the tip of the Castillogrande peninsula, in Bay of Cartagena (Fig. 2). However, in a broader sense, if the possibility of an oil spill were to be part of the hypothesis, it includes the entire bay.

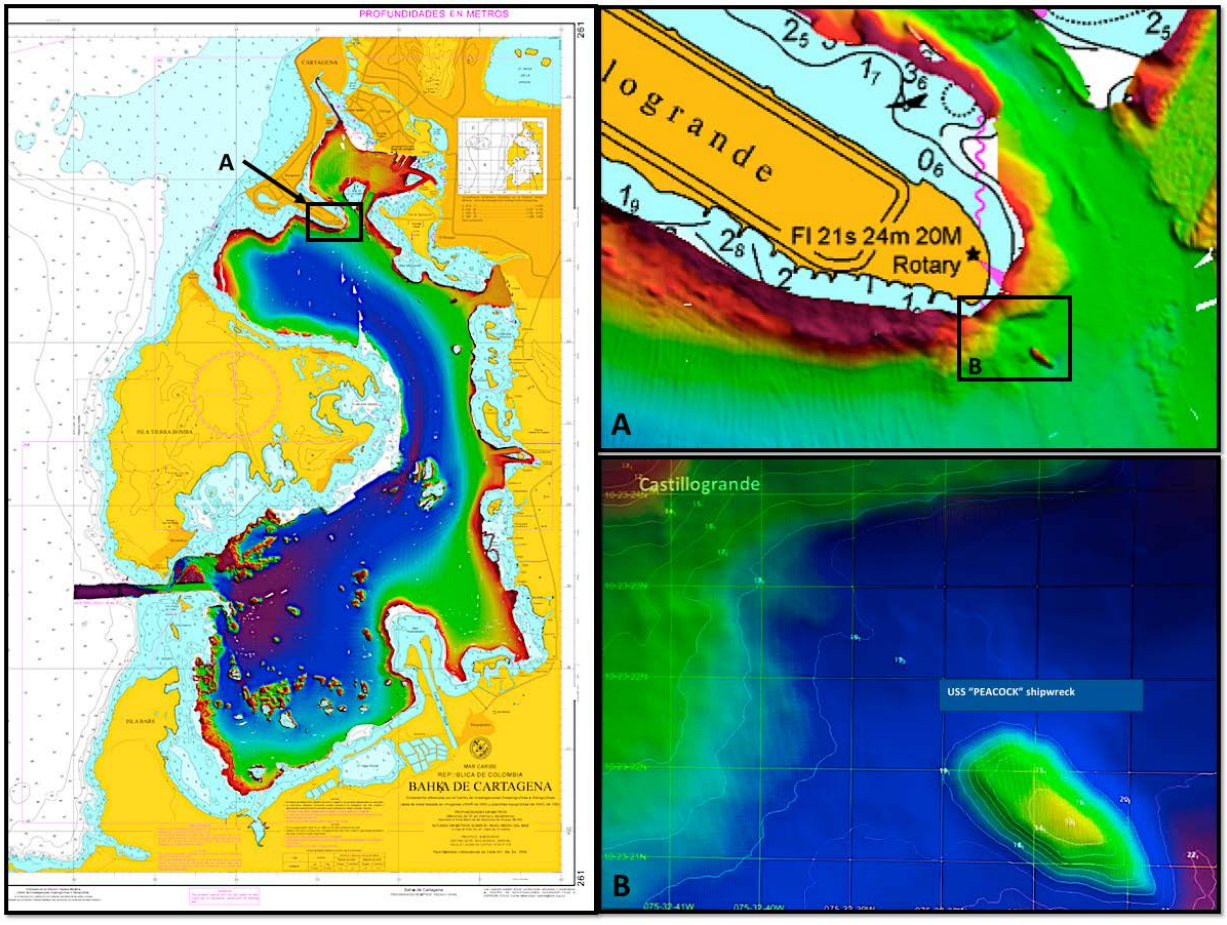

Figure 2. Bathymetric surface, created using a multibeam sonar, overlaid on nautical chart COL 261 on order to identify features in Cartagena Bay (Mora et al., 2018). In the Cuatro Calles area (**A)**, the anomaly representing location of the wreck (**B)** can be observed in the navigation channel in front of the Castillogrande peninsula.

The area in which the wreck is located is commonly known as Cuatro Calles. It is the deepest point in the channel, where hydrodynamic forces from the Bocagrande Channel converge, and where ocean currents, driven by the tide within the outer bay, pass by the wreck as they enter and exit the inner bay, carrying sediments from the Canal del Dique to the area (Andrade, Arias, & Thomas, 1988).

As a result, the sediments in the area are very fine within the channel and the inner bay (Thomas *et al*., 2005; Andrade *et al*., 2004). The bottom currents are relatively higher along the navigation channel (Lonin & Giraldo, 1996), creating a layer of high turbidity near the bottom. Consequently, visibility is low (around 1 m) in the deep area. This characteristic improves in the intermediate zone below the surface layer, where clear waters

are often found, allowing for professional diving operations, with all the mentioned limitations.

Methodology

A description of the vessels involved in the accident and what was known about the circumstances surrounding the collision and subsequent sinking of the tugboat was made based on a review of historical documents. The bathymetric surface used for this description was the result of processing conducted to identify geomorphological features in the Bay of Cartagena, which were found and analyzed during the first-order bathymetric survey carried out using a Reson 7125 multibeam echosounder at 200 and 400 kHz with 512 beams. This equipment was accompanied by a Trimble differential global positioning system and Octans motion sensors, all used during investigations conducted by the Center for Oceanographic and Hydrographic Research of the Caribbean (CIOH) in the Bay of Cartagena between 2015 and March 2016, as documented in Mora *et al*. (2018).

To describe the current situation of the wreck, we used images from an Edgetech 4100FS side-scan sonar provided by the company Exocol, captured along profiles controlled with high-resolution positioning (DGPS). The very low visibility on the seabed in that area has prevented the presentation and better description through underwater photography. Finally, the present wreck is placed in the context of the growing attention to the need to take action and evaluate the condition of the wreck of the USS Peacock and similar sunken ships from World War II to prevent potential consequences within the bay.

Results and Discussion

The tugboat USS Peacock

The USS Peacock was the former minesweeper with the hull number AM 46. It had a displacement of 840 tons, a length of 187.1 feet, a beam of 35.5 feet, a depth of 8.10 feet, and a design draft of 14 feet (Fig. 3). Its keel was laid on 31 August 1918 at the Staten Island Shipbuilding Company. It was launched on 08 April 1919, with Miss A.M. Danner as its sponsor, and commissioned on 27 December 1919. Lieutenant John Danner served as the commanding officer.

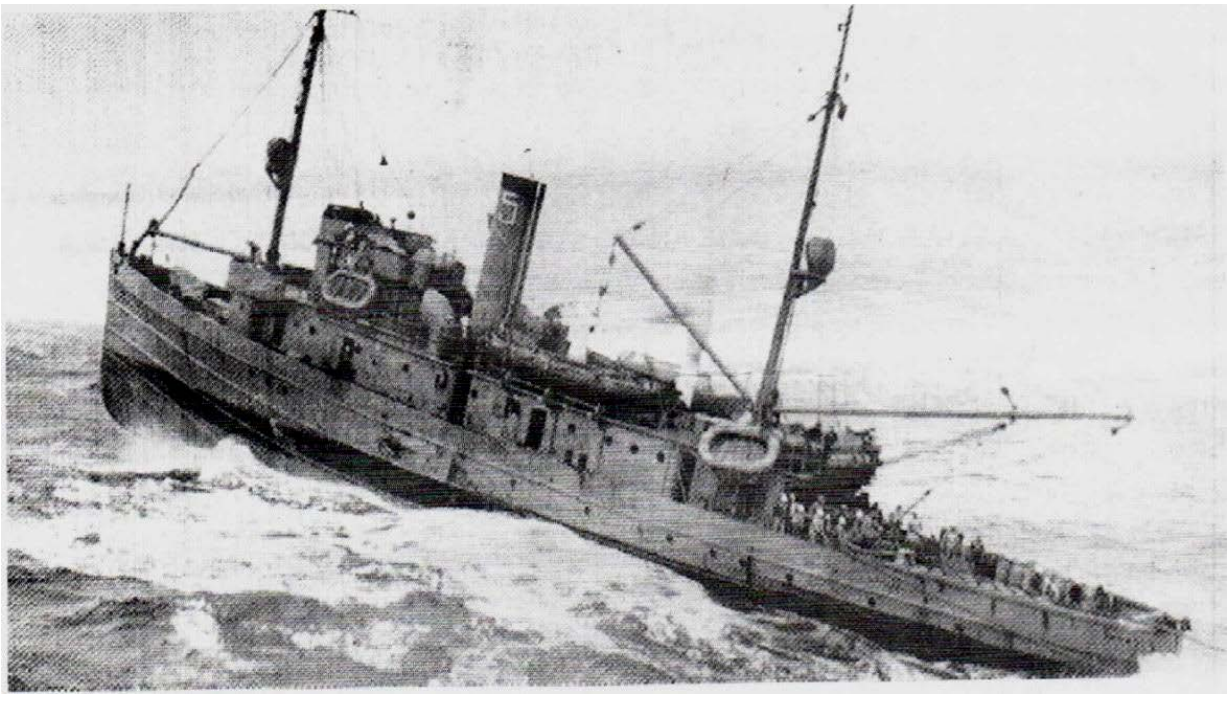

Figure 3. Image of the USS Lapwing, the sister ship of the USS Peacock, which sank in Cartagena Bay (images at en.wikipedia.org/wiki/Lapwing-class minesweeper)

After provisioning, the USS Peacock remained at the Navy pier in New York until it was officially decommissioned on 14 February 1920. On the same day, it was handed over for charter to the Office of Shipping. Converted into a salvage tug, the USS Peacock served under contract in various commercial activities until 24 August 1940, when it collided with the Norwegian merchant vessel MS Hindanger near the tip of the Castillogrande peninsula and sank. It was struck from the United States Navy's ship registry on 22 April 1941 (Naval History and Heritage Command, 2022).

The MS Hindanger

The MS Hindanger was a Norwegian-flagged merchant vessel (Fig. 4), with a tonnage of 4 885 gross tons and 8 200 tons deadweight (TDWT), a length of 395 feet, a beam of 54.6 feet, and a draft of 28.9 feet. It was powered by two 6-cylinder 4-stroke 4 200 hp engines, which gave it a top speed of 12.5 knots. Its call sign was LDKC. It was delivered in October 1929 by Sir W. G. Armstrong, Whitworth & Co. Ltd., Newcastle upon Tyne.

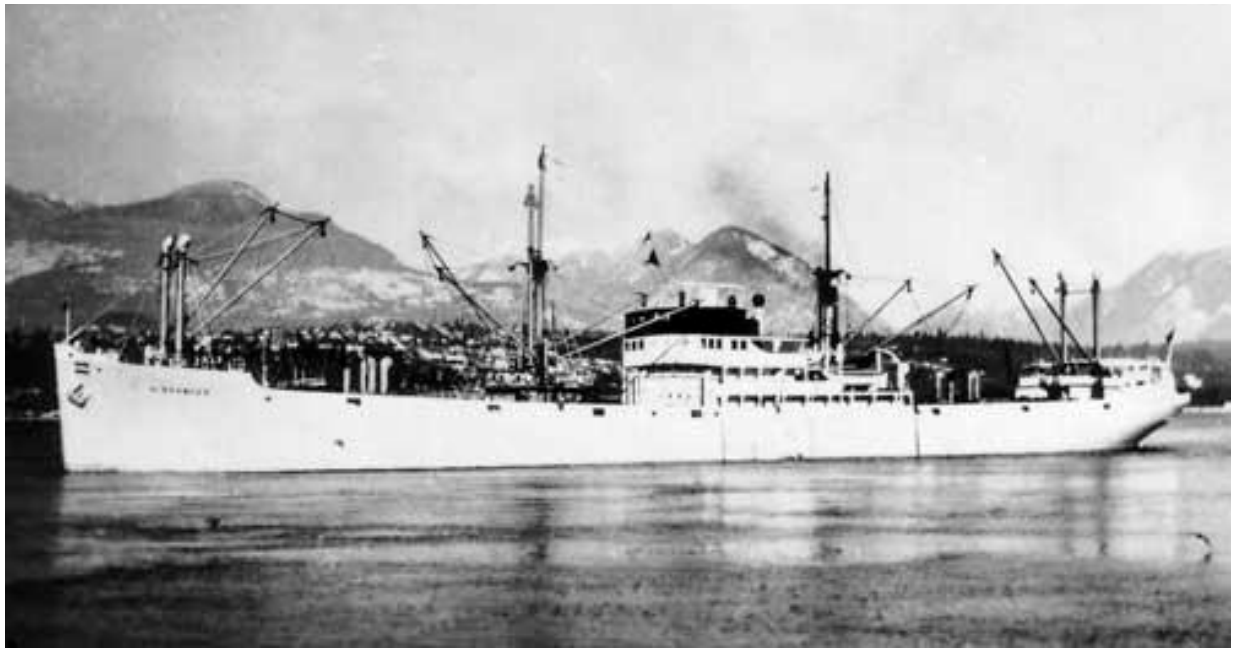

Figure 4. Image of the MS Hindanger (Photo received from Aage A. Wilhelmsen, Norway - owned by Kaspar Skjerve at the Westfal-Larsen & Co. A/S agency in Bergen)

It was leaving the inner bay when it encountered the USS Peacock right at the tip of the Castillogrande peninsula, where the channel is narrow for maneuvering, and ended up colliding head-on with the beam of the tugboat. Following the collision in the Bay of Cartagena (Fig. 4), the SM Hindanger became a victim of the war. It had arrived in Liverpool on 21 August 1942, and later joined the North Atlantic convoy ON 127, heading west, departing from Liverpool on 04 September. It was enroute to New York but never reached its destination. On 11 September 1942, it was torpedoed by U-584 (Kapitänleutnant Joachim Deecke) at position 49° 39'N – 32° 24'W (Warsailors, 2011).

News of the accident and sinking of the USS Peacock

In the words of a newspaper of the time:

"The USS Peacock was unable to perform the evasive maneuver and this caused the bow of the Norwegian steamer to split it in two. José Rodríguez, a Portuguese citizen, jumped into the water and was saved. He was doing laundry in the kitchen when the collision occurred. The casualties were: Chief Engineer Mr. Robert A. Casid, Radio Operator John Harston, and Sailor Louis Nelson; initially, the wreckage of the tugboat was not located, which led to a subsequent search. Of

the crew, 23 were saved: Captain A. Hansen, M. Rivewrs, W. Rosso, T. Ziegles, K. Krogidad, L.H. Sorensen, George Culberston, Jacob Jacobsen, Henrick Palker, M. Sculman, McCarty, Doug Lopez, John Saloon, John Bauer, L. Stoab, Patzy H. Soilor, Martin Rehien, Stanley Pumpenger, J. Croops, and A. Norad. The news clarified that the tugboat belonged to the USN and not to the Tropical Fruit Company, being leased to Merritt Chapman and Scott Corp, and the agency in Cartagena and Panama was Tropical Oil." (El Fígaro, Monday 26 August 1940).

Subsequently, a note was written about the efforts to locate the site of the wreck to assess potential navigational hazards:

"The technical personnel from the Naval Base managed to locate the site where the remains of the American tugboat were found the following day, and the Norwegian steamer resumed its journey a few days later. By conducting surveys, it was determined that it had sunk in the deepest part of the channel, presenting itself as 'a blessing for our port,' as a large vessel had sunk and had not affected navigation." (El Fígaro, Tuesday 27 August 1940).

Current status of the wreck

The wreck of the Peacock has been marked in Notices to Mariners and incorporated into nautical charts since the time of its sinking, as shown in Figure 1. More recently, the wreck has been visually visited and inspected through diving operations since July 1992 by the Marine Infantry Special Forces and the Diving and Salvage Department of the Colombian National Navy. Since then, the wreck has been continuously visited and has become a mandatory location for diver training in low-visibility inspections. From the earliest dives, it became evident to the divers that the ship's internal structure retains a large quantity of "black droplets" that rise to the surface (fuel oil drops) and mark the wreck's location, which has always raised interest and concern due to its proximity to the city.

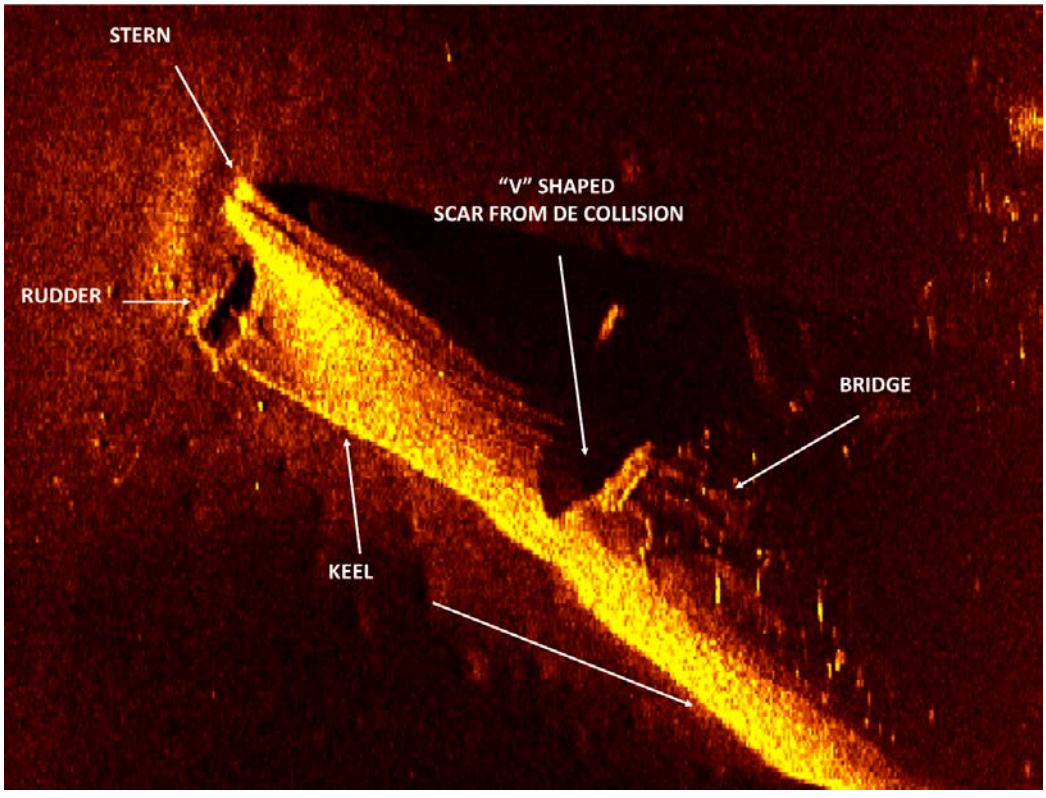

Figure 5. Side-scan sonar image (600 kHz) of the wreck of the tugboat USS Peacock in the Bay of Cartagena. Note the V-shaped scar on the hull resulting from the collision.

The side-scan sonar image (Fig. 5) shows that the ship rests on its port side in one piece, with a deep V-shaped scar near the engine room, a result of the collision with the MS Hindanger

Images from sonar surveys indicate that the ship's structure is still well-preserved. However, dive inspections report that the structure is completely encrusted, especially in the shallower part, up to about 17 m in depth, which is the lower limit of the oceanic water that is more transparent to sunlight. A significant amount of fine silt has accumulated on top of these encrustations. Additionally, reports indicate that metal deterioration is evident in many places on the starboard side. Further aspects of the wreck can be found in Santos and Rojas (2015) and Andrade (2021).

Apart from the continuous release of fuel oil drops that rise to the surface, no specific studies or analyses related to environmental contamination at this site have been conducted. Only on an ad hoc basis, in 1985, were concentrations of dissolved and dispersed hydrocarbons detected at the Caripol program station (Caribbean Pollution - an Iocaribe Program), located closest to the wreck in Bay of Cartagena, with a value of 17.9 µg/L. At that time, these residues were mostly attributed to maritime transport, docking and landing activities, and industrial uses (Garay, 1987).

Recent studies in the Bay of Cartagena have examined polycyclic aromatic hydrocarbons (PAHs) in sediments and dissolved and dispersed hydrocarbons in water. For the sediments, the results of Tous *et al*. (2015) and Mejía (2015) agree that the bay's sediments are contaminated with PAHs, inferring that some of these compounds arise from port activity in this bay. Regarding the water matrix, Sánchez *et al*. (2020) conducted a physicochemical characterization of a loading port in the Bay of Cartagena and detected the presence of dissolved and dispersed hydrocarbons at the surface water sampling points near the port's loading and unloading area. However, there are no specific studies on dissolved or dispersed hydrocarbons in water at the tip of the Castillogrande Peninsula, the location of the wreck.

On the brink of an ecological disaster

Likewise, at the bottom of the sea, a large number of ships that were sunk by the forces of the world wars lie dormant. It is estimated that there are at least 6 338 ships sunk worldwide solely as a result of the Second World War, many of which have characteristics similar to the USS Peacock.

It is estimated that wrecks contain between 2.5 and 20.5 million tons of fuel oil in their tanks, which could rupture and cause the same type of damage as an oil spill today. This could mean that there is much more oil contained in tanks sunk in the sea than previously estimated.. In response to this situation, in 2010, officials from the National Oceanic and Atmospheric Administration (NOAA) aboard the USS Baseline Explorer made an inventory and database, applying 21 criteria, and resulting in the risk classification of the sunken ships in US waters (McCay *et al*., 2014).

Being inside the Bay of Cartagena, the USS Peacock poses a real risk. A potential leak would reach the shore in a short time. This is a situation similar to the one that identified in Puck Bay, Gdynia, Poland by the oceanographic vessel Imor from the Gdansk Maritime Institute. Inspections of the wreck of the German hospital ship Stuttgart, which sank on 09 October 1943, 2 km from Gdansk Bay and at a depth of 20 m, revealed significant amounts of emulsified fuel in the sediment (Rogowska, Wolska, & Namiesnik, 2010).

It is known that steel plates lose between 1.5 mm and 2 mm of thickness per decade, which may seem insignificant, but over the decades following 1940, they have become unstable and can rupture under minimal pressure. This presents the greatest challenge for controlled oil recovery, as it is difficult with ships that are over 50 years old due to the progressive corrosion they have suffered. For these reasons, it is important to assess the possibility of doing it now because in 10 or 20 years, an oil recovery operation may be impossible. The long-term cost may be much worse, and waiting is not a solution. Norway has already taken action by removing fuel from wrecks in their waters (DW-Deutsche Welle, 2020).

Several issues require immediate attention and answers. For example, it is necessary to understand whether or not the fuel on board the USS Peacock would be emulsified to the same extent as the German ship. The ship had just completed a voyage; how much fuel did it have on board? How can valves be installed without breaking the tank walls? Since it was a former minesweeper converted into a USN tugboat, can measures be taken without the permission of the US government?

Conclusion and Recommendation

As mentioned earlier, this manuscript does not intend to present conclusions regarding the USS Peacock's situation. Instead, it aims to inform in the context of the environmental situation about what is happening and how similar situations are being addressed worldwide.

The author's opinion is that this is a chronic problem that must be confronted. It is urgent to invest in ensuring the environmental health of the Bay of Cartagena, especially along the coast of Castillogrande. In this regard, it is essential to conduct a detailed inspection of this situation. If there is a significant amount of fuel on board the USS Peacock, solutions must be found to extract it from the ship because a leak from a fuel oil tank within the bay could be disastrous. If there is fuel on board, the question is not whether a leak will occur, but when it will happen.

Acknowledgments

The author expresses gratitude to Major of the Marine Infantry (RA) Miguel Enrique Rozo, my diving partner when we "rediscovered" the wreck site. Thanks to the divers of the Diving and Salvage Department of the Naval Base in 1992 for their collaboration and assistance in the interior characterization of the wreck's stability. Thanks also to the oceanographers and hydrographers of the CIOH for their support over the years. Many of them took part in and helped with the numerous diving and echo sounding sessions during all these years, getting to know the wreck. And finally, thanks to the proofreaders from this journal for their anonymous help and contributions

Funding Source

This manuscript was produced with funds from the company Exploraciones Oceánicas de Colombia (Exocol S.A.S.).

Bibliography

Andrade, C. A. (2021). Interpretación de imágenes de sonar de barrido lateral y de sonda multihaz sobre anomalías culturales en la bahía de Cartagena. *CIOH Sci. Bull.,* 40(1): 19-24. https://doi.org/10.26640/22159045.2021.559

Andrade, C. A.; Thomas, Y.; Lonin, S.; Parra, C.; Menanteau, L.; Cesaraccio, M.; Kunesch, S.; Andriau, A.; Piñeres, C.; Velasco, S. (2004). Aspectos morfodinámicos de la bahía de Cartagena de Indias. *CIOH Sci. Bull.,* 22: 90-104. https://doi.org/10.26640/22159045.131

Andrade, C. A.; Arias, F.; Thomas, Y. (1988). Nota sobre la turbidez, circulación y erosión en la región de Cartagena. *CIOH Sci. Bull.,* 8: 71-82. https://doi.org/10.26640/22159045.29

DW-Deutsche Welle. (2020). The Black Tears of the Sea: The Lethal Legacy of Wrecks. TV documentary produced by Längengrad Filmproduktion for the WDR in cooperation with Arte. Written and directed by Christian Heynen; camera by Michael Kern; underwater cameras by Konrad Dubiel, Matthias Granberg, Jörn Kumpart, Allison Low and Chris Selman; edited by Jan Wilm Schmülling; music by Thomas Wolter. English version released in July 2020 by Deutsche Welle. Running time: 42 minutes.

Garay, J. A. (1987). Vigilancia de la contaminación por petróleo en el Caribe Colombiano (Punta Canoas hasta Barbacoas, Cartagena, Colombia). *CIOH Sci. Bull.,* 7: 101-118. https://doi.org/10.26640/22159045.25

Lonin, S.; Giraldo, L. (1996). Influencia de los efectos térmicos en la circulación de la Bahía Interna de Cartagena. *CIOH Sci. Bull.,* 17: 47-56. https://doi.org/10.26640/22159045.84

McCay, D. F.; Reich, D.; Michel, J.; Etkin, D.; Symons, L.; Helton, D.; Wagner, J. (2014). For Response Planning: Predicted Environmental

Contamination Resulting from Oil Leakage from Sunken Vessels. In: *International Oil Spill Conference Proceedings.* p. 300108. https://doi.org/10.7901/2169-3358-2014-1-300108.1

Mejía, G. E. (2015). *Hidrocarburos aromáticos policíclicos en la Costa Caribe colombiana y posibles fuentes de contaminación*. Tesis de maestría. Universidad de Cartagena. Cartagena, 109 pp.

Mora, H.; Carvajal, J. H.; Ferrero, A.; Leon, H.; Andrade, C.A. (2018). Sobre emanaciones de gas natural y subsidencia en la bahía de Cartagena de Indias. *CIOH Sci. Bull.,* 37: 35-51. https://doi.org/10.26640/22159045.2018.448

Naval History and Heritage Command. (2022). *Peacock III (AM-46).* https://www.history.navy.mil/research/histories/ship-histories/danfs/p/peacock-ii.html

Rogowska, J.; Wolska, L.; Namiesnik, J. (2010). Impacts of pollution derived from ship wrecks on the marine environment on the basis of s/s "Stuttgart" (Polish coast, Europe). *Science of the Total Environment,* 408: 5775–5783. https://doi.org/10.1016/j.scitotenv.2010.07.031. PMid:20863551.

Sánchez, F.; Mayo, G.; Rivero, J.; Mercado, J.; Johnson, B. (2020). Caracterización fisicoquímica de aguas y sedimentos en puerto de carga de la bahía de Cartagena, Colombia. *CIOH Sci. Bull.,* 39(2): 41-50. https://doi.org/10.26640/22159045.2020.505

Santos, Y.; Rojas, H. (2015). Aplicación de la hidrografía en la prospección, exploración y conservación del patrimonio cultural sumergido de la nación. *CIOH Sci. Bull.,* 33: 221-230. https://doi.org/10.26640/22159045.288

Schimdt-Etkin D. (2011). Spill occurrences: A world overview. In: *Oil Spill Science and Technology, December.* https://doi.org/10.1016/B978-1-85617-943-0.10002-4

Thomas, Y. F.; Cesaraccio, M.; Kunesch, S. ; Andrieu, A. ; Menanteau, L.; Andrade, C. ; Lonin, S.; Parra, C.; Piñeres, C.; Velasco, S. (2005). *Étude morpho dynamique de la baie de Carthagène des Indes (Colombia), Milieux littoraux: Nouvelles perspectives d'étude.* 171-191. Editorial L'Harmattan.

Tous, G.; Mayo, G.; Rivero, J.; Llamas, H. (2015). Evaluación temporal de los niveles de los hidrocarburos aromáticos policíclicos en los sedimentos de la bahía de Cartagena. *Revista Derrotero,* 9(1): 7-12.

Warsailors. (2011). https://www.warsailors.com/singleships/hindanger.html